

# PATENT SPECIFICATION

DRAWINGS ATTACHED

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## COMPLETE SPECIFICATION

### Optical Projection Device

We, BELLING & COMPANY LIMITED, of Bridge Works, Enfield, Middlesex, a British Company, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to an optical projection device for simulating flames, smoke, water and other moving fluid media.

The invention provides an optical projection device for simulating flames, smoke, water, and the like, including a light source, a viewing screen, and a rotatable randomly faceted drum or like member arranged to reflect onto the viewing screen light from the light source. By suitably colouring the light source and/or the screen and/or the facets the light reflected onto the screen can be made to produce the appearance of flames, smoke, water or the like.

In a preferred arrangement the drum is basically of cylindrical or prismatic form, e.g. a regular octagon in cross section, and has a lightly crinkled reflective surface, e.g. a thin material such as aluminium foil covering a rotatable framework.

An embodiment of the invention will now be described with reference to the drawings accompanying the Provisional Specification in which:

Figure 1 is a cross section of the device incorporated in an electric fire; and

Figure 2 illustrates the drum construction, and with reference to the accompanying drawing, in which Figure 3 illustrates a modification of the device shown in Figure 1.

The projection device shown forms part of an electric fire of the sort in which electric radiant heating elements 1 are combined with a "coal" or "log" effect, i.e. one or more

pieces 2 of translucent material shaped and coloured to resemble coal or logs and lit from behind to give the appearance of burning, a screen 3 visible behind and above the "coal" or "logs" being also illuminated to simulate a fireplace in which a solid fuel is burning. It is usual to provide a flicker effect in the light used to illuminate the "coal" or "logs" and the screen and our projection device may be used as shown to produce this effect.

The device consists essentially of a light source 4 such as a red or orange tungsten filament lamp (or a row of these if the fire is long) the light from which is focused by a polished metal reflector 5 onto a rotating drum 6. The drum consists of end disks 7 between which stretch wire ribs 8 to form an octagonal cage, one end disk being driven clockwise (in Figure 1), e.g. by a small synchronous motor, at about 30 r.p.m. The cage is covered by a skin of polished aluminium foil 9 which is lightly crinkled so as to produce a multi-faceted surface as shown in Figure 1 and at the right in Figure 2, and the drum is placed so that it reflects onto screen 3 the light directed onto it by lamp 4 and reflector 5. A baffle 10 which may be reflective or non-reflective prevents light from lamp 4 from reaching the screen directly. In front of the drum is a dark surface 11 lit by lamp 4. The "coal" 2 is lit by stray light from lamp 4 and drum 6.

Owing to the irregularity of the surface of the drum 6, the light falling on the screen 3 does not illuminate the screen uniformly but is broken up into patches of varying brightness and, if the drum surface is not uniformly coloured, patches of varying colour, these patches being somewhat elongated in the vertical direction. Consequently, as the drum rotates, these

patches move up the screen 3 and produce a pattern of flickering and shifting brightness and colour simulating flames. A similar but less intense flickering effect occurs in the light striking the "coal" 2 from below. The total effect is a very realistic simulation of an open coal fire.

A polished reflector 12 as shown in Figure 3 may be placed between drum 6 and screen 3 to reflect onto the underside of the "coal" 2 light reflected at the drum which would not reach a visible part of the screen. Some of the light thus reflected onto the "coal" may eventually reach the screen by reflection or scattering. Further "coal" 2a may extend forward from the screen, a gap being left between the front and rear "coal" for illumination of the screen, and the reflector may be placed at the front end of the rear "coal" 2a. Screen 3 should be reflective but not specular. We have found that horizontally brushed anodized aluminium or other metal is suitable. The shapes of flames may be pressed into the screen.

To produce reflections of differing colours, as mentioned above, patches of coloured transparent foil may be fastened over the reflective foil 9 constituting the surface of drum 6, or patches of coloured reflecting material may be used. To simulate smoke parts of the drum may be left bare of foil as shown at the left of Figure 2. This allows light from surface 11 to reach screen 3 through the drum and the wires 8 then cast shadows on the screen which move and simulate smoke.

Our device has a number of advantages over conventional flicker mechanisms. The drum can easily be made of a length to suit any electric fire and its speed can be controlled (in contrast to those mechanisms that rely on convection currents for their movement). The effect produced can be changed easily by altering the foil or foils on the drum or by adding layers of coloured foil. Since the drum can be as long as the screen and parallel to it a uniformly realistic effect can be produced throughout the length of the screen. The drum can be shaped, e.g. to the shape of a barrel, to correspond to the shape of the screen if curved, or to produce special effects. In general, the use of a reflective drum leads to a device which is more flexible and more realistic than known flicker mechanisms using transmitted light.

Although our device has been described with reference to an electric fire with coal effect, it can also be used, e.g. for advertising displays and theatre effects or for purely ornamental light projection. For such uses screen 3 may be replaced by a translucent screen for back projection, i.e. to be viewed from the side away from the drum.

#### WHAT WE CLAIM IS:—

1. An optical projection device for simulating flames, smoke, water, and the like, including a light source, a viewing screen, and a rotatably randomly faceted drum or like member arranged to reflect onto the viewing screen light from the light source.

2. An optical projection device as claimed in claim 1, including a drum of basically cylindrical shape having a slightly crinkled reflective surface.

3. An optical projection device as claimed in claim 1, including a drum of basically prismatic shape having a lightly crinkled reflective surface.

4. An optical projection device as claimed in claim 2 or 3, in which the drum consists of a rotatable framework at least partly covered by a thin lightly crinkled reflective material.

5. An optical projection device as claimed in any of claims 2 to 4 having patches of coloured transparent foil fastened over the reflective surface.

6. An optical projection device as claimed in any of claims 1 to 5 having a dark surface illuminated by the light source and located on the side of the drum away from the screen.

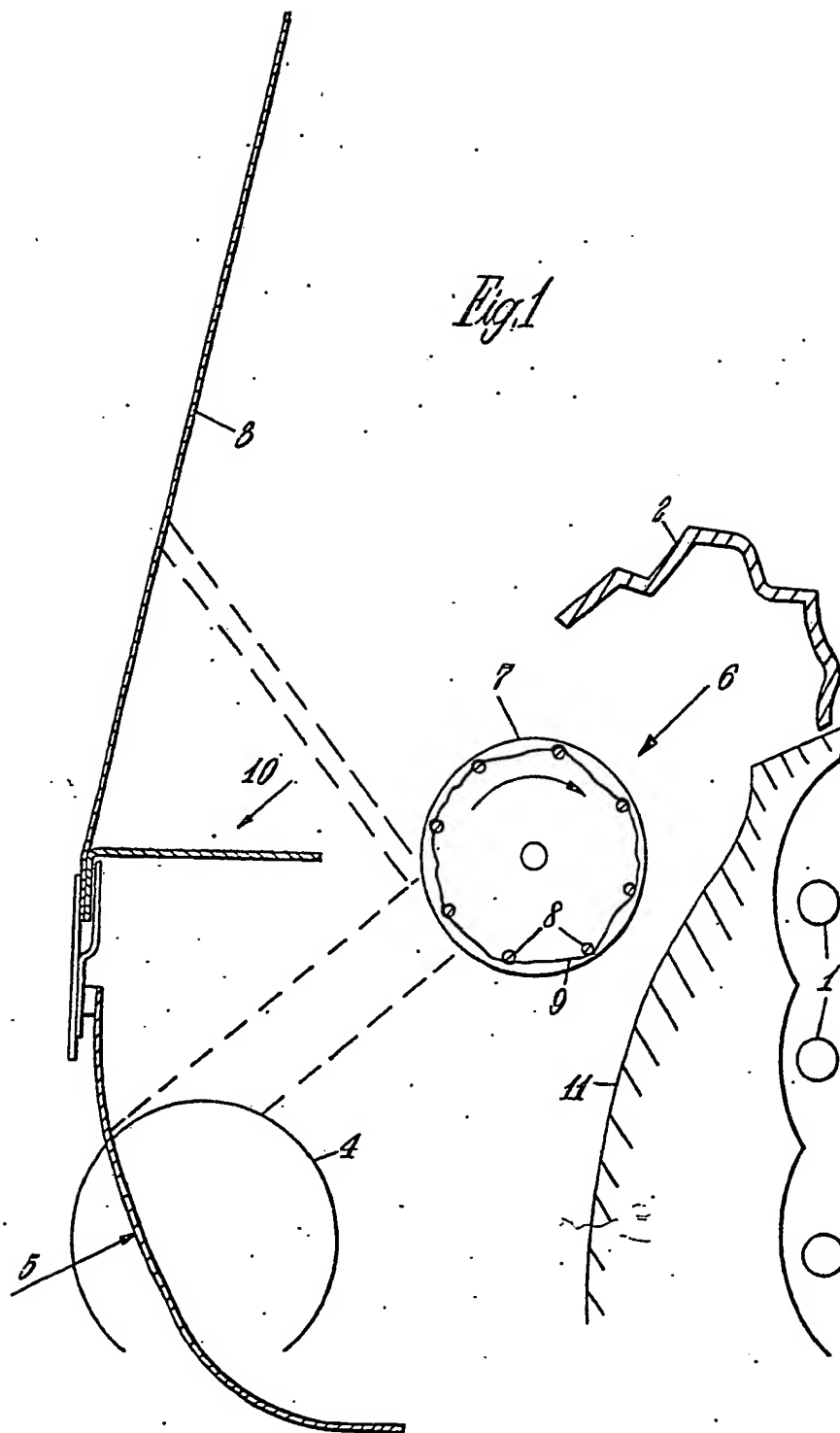
7. An optical projection device substantially as herein described with reference to the drawings accompanying the Provisional Specification.

8. An electric fire incorporating a flicker effect provided by an optical projection device as claimed in any of claims 1 to 7.

9. An electric fire substantially as herein described with reference to the drawings accompanying the Provisional Specification.

10. An electric fire substantially as herein described with reference to the accompanying drawing.

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*Fig. 2*

